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## Software Engineering Group L - Batch 2018

User Manual

This is the extensive manual for using the probability of detection system

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# Introduction

## Background

The theoretical model used in electro optical systems is similar to the models used in radar and laser systems and the detection on sinusoidal signal in gaussian noise. This is popular because an analytical solution is obtained where a the probability of detection can be related to signal to noise ratio. Considering a sinusoidal signal argument by gaussian noise in the detection filter. The expression results obtained are used to make this system.

## Aim

To develop a system that can easily calculate the Probability of detection and also Plot the trends in the changes in the probability of detection as the signal to noise ratio and Probability of false alarm are changed.

**PRODUCT & PROCESS**

## Requirements

1. A Personal Computer with the latest working version of MATLAB.
2. A basic knowledge of MATLAB

## Quick Start

1. Change working directory of MATLAB to the folder containing all the scripts or copy all the scripts to the current working directory.
2. Run the appropriate script or function in the matlab command window.

# USING THE FUNCTIONS

## Plot Probability of Detection V/S Signal to Noise Ratio

* Function Call : pd\_plot( Pn ) where Pn  is the probability of false alarm

## Plot Pn V/S S/N Ratio for multiple Pn on a linear scale

* Function Call : pd\_graph( )

## Plot Pn V/S S/N Ratio for multiple Pn on a log scale

* Function Call : pd\_graphlog( )

## Plot Pn V/S S/N Ratio for multiple Pn on a custom scale

* Function Call : pd\_graphcustom( )

## Calculate Probability of Detection

* Function Call : pd\_calc( Pn , S/N ) where Pn  is the probability of false alarm and S/N is the signal to noise ratio in dp.

## Use POD Application

* Call : podsystem
* Application to seamlessly work without using the above functions.

# RESOURCES

## Mailing lists

For any more information on the system contact on the following email id.

* namansinghal198@gmail.com

## References

* Millimeter-Wave and Infrared Multisensor Design and Signal Processing (Lawrence A. Klein)